



National Voluntary Laboratory Accreditation Program



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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CALIBRATION LABORATORIES

NVLAP LAB CODE 200730-0

NVLAP Code: 20/A01

ANSI/NCSL Z540-1-1994; Part 1

Compliant

DIMENSIONAL

NVLAP Code: D05

Length and Diameter; Step Gages ^{note 2}

Micrometers – Outside, Inside, Depth

Range

(0.02 to 4) in
(4 to 8) in
(8 to 16) in
(16 to 20) in

Best Uncertainty (\pm) ^{note 1}

(12 + 14L) μ in
(23 + 14L) μ in
(34 + 14L) μ in
(46 + 14L) μ in

Remarks

Comparison to Gage Blocks
Comparison to Gage Blocks
Comparison to Gage Blocks
Comparison to Gage Blocks

Calipers – Outside, Inside, Depth
to 36 in

(46 + 14L) μ in

Comparison to Gage Blocks

Dial Indicators
(0.0625 to 6) in

(23 + 14L) μ in

Comparison to Gage Blocks

2007-01-01 through 2007-12-31

Effective dates

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NVLAP LAB CODE 200730-0

ELECTROMAGNETICS – DC/LOW FREQUENCY

NVLAP Code: 20/E02

AC Current

Range	<i>Best Uncertainty (\pm) in % ^{note 1}</i>			
	<i>10 to 40</i>	<i>40 to 20 k</i>	<i>20 k to 50 k</i>	<i>50 k to 100 k</i>
100 μ A	0.04	0.04	0.05	
1 mA	0.02	0.02	0.011	
10 mA	0.02	0.02	0.01	0.012
20 mA	0.021	0.009	0.01	0.012
50 mA	0.021	0.006	0.009	0.014
100 mA	0.021	0.008	0.01	0.014
200 mA	0.02	0.008	0.01	0.01
1 A	0.021	0.009	0.02	0.02
2 A	0.02	0.008	0.02	0.02
5 A	0.02	0.01	0.02	0.03
10 A	0.02	0.02	0.02	
20 A	0.02	0.01	0.023	

AC Current ^{note 2}

Measuring Equipment and Measure

Range	<i>Best Uncertainty (\pm) in % + A ^{note 1}</i>			
	<i>10 to 20</i>	<i>20 to 45</i>	<i>45 to 100</i>	<i>100 to 5 k</i>
(0 to 100) μ A	0.5 + 30 n	0.2 + 30 n	0.07 + 30 n	0.07 + 30 n
(0.1 to 1) mA	0.5 + 200 n	0.2 + 200 n	0.07 + 200 n	0.04 + 200 n
(1 to 10) mA	0.5 + 2 μ	0.2 + 2 μ	0.7 + 2 μ	0.04 + 2 μ
(10 to 100) mA	0.5 + 20 μ	0.2 + 20 μ	0.7 + 20 μ	0.04 + 20 μ
(100 to 1000) mA	0.5 + 200 μ	0.2 + 200 μ	0.1 + 200 μ	0.12 + 200 μ

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NVLAP Code: 20/E05

DC Resistance

Measuring Equipment and Measure

Range	Best Uncertainty (\pm)^{note 1}	Remarks
0 Ω to 0.1 mΩ	2 nΩ	Standard Resistors w/Low Thermal Switch
0.1 mΩ to 1 mΩ	15 nΩ	Standard Resistors w/Low Thermal Switch
1 mΩ to 10 mΩ	23 ppm	Standard Resistors w/Low Thermal Switch
10 mΩ to 100 mΩ	31 ppm	Standard Resistors w/Low Thermal Switch
0.1 Ω to 1 Ω	1 ppm	Standard Resistors w/Guildline 9975 Bridge
1 Ω to 10 Ω	1.2 ppm	Standard Resistors w/Guildline 9975 Bridge
10 Ω to 100 Ω	1 ppm	Standard Resistors w/Guildline 9975 Bridge
100 Ω to 1 kΩ	1.1 ppm	Standard Resistors w/Guildline 9975 Bridge
1 kΩ to 10 kΩ	0.34 ppm	Standard Resistors w/Guildline 9975 Bridge
10 kΩ to 100 kΩ	4 ppm	Standard Resistors w/Guildline 9975 Bridge
100 kΩ to 1 MΩ	8 ppm + 1 Ω	Standard Resistors w/Fluke 8508A in transfer mode
1 MΩ to 10 MΩ	40 ppm + 10 Ω	Standard Resistors w/Fluke 8508A in transfer mode
10 MΩ to 100 MΩ	12 ppm + 100 Ω	Standard Resistors w/Fluke 8508A in transfer Mode
100 MΩ to 1 GΩ	161 ppm + 100 kΩ	Standard Resistors w/Fluke 8508A in transfer Mode
1 GΩ to 20 GΩ	525 ppm + 10 MΩ	Standard Resistors w/Fluke 8508A in transfer mode
Resistance Ratio		
1 Ω to 1 kΩ	0.3 ppm	Guildline 9975 Bridge
Measuring Equipment and Measure ^{note 2}		
10 mΩ to 10 Ω	20 ppm + 0.05 mΩ	HP3458A w/Decade Resistor
10 Ω to 1 MΩ	20 ppm + 0.5 mΩ	HP3458A w/Decade Resistor
1 MΩ to 10 MΩ	65 ppm + 50 mΩ	HP3458A w/Decade Resistor
10 MΩ to 100 MΩ	0.07 % + 1 kΩ	HP3458A w/Decade Resistor

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100 MΩ to 1 GΩ 0.6 % + 10 kΩ HP3458A w/Decade Resistor

Measuring Equipment ^{note 2}

10 GΩ to 100 GΩ 1.8 % Biddle Mega Dek
1 TΩ 3.6% Victoreen

DC Current

Measuring Equipment and Measure

Range	Best Uncertainty (\pm) ^{note 1}	Remarks
0 A to 100 μA	2.1 nA	Standard Shunts w/current source
100 μA to 1 mA	15 ppm	Standard Shunts w/current source
1 mA to 100 mA	3.2 ppm	Standard Shunts w/current source
100 mA to 1 A	30 ppm	Standard Shunts w/current source
1 A to 10 A	15 ppm	Standard Shunts w/current source

DC Current ^{note 2}

Measuring Equipment and Measure

0 μA to 100 μA	26 ppm + 0.8 nA	HP3458A w/current source
100 μA to 1 mA	26 ppm + 5 nA	HP3458A w/current source
1 mA to 10 mA	26 ppm + 50 nA	HP3458A w/current source
10 mA to 100 mA	42 ppm + 0.5 μA	HP3458A w/current source
100 mA to 1 A	0.013 % + 10 μA	HP3458A w/current source
1 A to 20 A	0.03 %	Valhalla 2575A w/Fluke 5520A

Measure Only

1 A to 100 A 0.06 % Valhalla 2575A

Clamp-on Ammeter Toroidal Type

20 A to 150 A 0.3 % + 20 mA 5520A/coil w/Fluke 5220A Amplifier
150 A to 1000 A 0.3 % + 90 mA 5520A/coil w/Fluke 5220A Amplifier

Non-Toroidal Type

20 A to 150 A 0.6 % + 140 mA 5520A/coil w/Fluke 5220A Amplifier

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150 A to 1000 A

0.6 % + 540 mA

5520A/coil w/Fluke 5220A Amplifier

NVLAP Code: 20/E06
DC Voltage – Fixed Points
Measuring Equipment and Measure

Range	Best Uncertainty (\pm) ^{note 1}	Remarks
0 V	90 nV	Ratio Metric w/Zener Reference
1 mV	90 ppm	Ratio Metric w/Zener Reference
10 mV	9.8 ppm	Ratio Metric w/Zener Reference
100 mV	1.6 ppm	Ratio Metric w/Zener Reference
1 V	0.47 ppm	Ratio Metric w/Zener Reference
10 V	0.3 ppm	Ratio Metric w/Zener Reference
100 V	0.4 ppm	Ratio Metric w/Zener Reference
1000 V	0.7 ppm	Ratio Metric w/Zener Reference
10 mV to 100 mV	4.6 ppm + 90 nV	Ratio Metric w/Zener Reference
100 mV to 1 V	2.4 ppm + 90 nV	Ratio Metric w/Zener Reference
1 V to 1000 V	2.4 ppm + 90 nV	Ratio Metric w/Zener Reference

DC Voltage ^{note 2}	Measuring Equipment and Measure
0 V to 100 mV	7.5 ppm + 0.5 μ V
100 mV to 10 V	5.1 ppm + 0.5 μ V
10 V to 100 V	7.5 ppm + 30 μ V
100 V to 500 V	11 ppm + 100 μ V
500 V to 800 V	17 ppm + 100 μ V
800 V to 1000 V	21 ppm + 100 μ V

Measure Only		
1 kV to 60 kV	0.12 %	VD120-3.1-B-K-BC
60 kV to 80 kV	0.13 %	VD120-3.1-B-K-BC
80 kV to 100 kV	0.14 %	VD120-3.1-B-K-BC
100 kV to 120 kV	0.17 %	VD120-3.1-B-K-BC

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NVLAP Code: 20/E09

AC Voltage

Frequency in Hz	Best Uncertainty (\pm) in % ^{note 1}			Remarks
	2 mV	10 mV	20 mV	
10	0.22	0.03	0.03	Fluke 792A
20	0.16	0.03	0.02	Fluke 792A
(40, 100)	0.16	0.03	0.014	Fluke 792A
(1, 10, 20) k	0.16	0.03	0.014	Fluke 792A
50 k	0.16	0.03	0.02	Fluke 792A
100 k	0.2	0.05	0.045	Fluke 792A
300 k	0.3	0.07	0.065	Fluke 792A
500 k	0.5	0.12	0.11	Fluke 792A
1 M	0.5	0.15	0.13	Fluke 792A

220 mV Range			
20 mV	100 mV	200 mV	
10	0.04	0.02	Fluke 792A
20	0.03	0.01	Fluke 792A
(40, 100)	0.02	0.005	Fluke 792A
(1, 10, 20) k	0.02	0.005	Fluke 792A
50 k	0.03	0.01	Fluke 792A
100 k	0.05	0.015	Fluke 792A
300 k	0.07	0.05	Fluke 792A
500 k	0.11	0.06	Fluke 792A
1 M	0.2	0.06	Fluke 792A

700 mV Range			
200 mV	600 mV		
10	0.022	0.02	Fluke 792A
20	0.008	0.007	Fluke 792A
(40, 100)	0.005	0.003	Fluke 792A
(1, 10, 20) k	0.005	0.003	Fluke 792A
50 k	0.01	0.005	Fluke 792A

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100 k	0.02	0.006	Fluke 792A
300 k	0.05	0.014	Fluke 792A
500 k	0.06	0.043	Fluke 792A
1 M	0.06	0.06	Fluke 792A

2.2 V Range

	600 mV	I V	2 V	
10	0.02	0.02	0.02	Fluke 792A
20	0.007	0.006	0.006	Fluke 792A
40	0.003	0.003	0.003	Fluke 792A
(0.1, 1, 10, 20) k	0.003	0.002	0.0011	Fluke 792A
50 k	0.005	0.004	0.004	Fluke 792A
100 k	0.006	0.005	0.005	Fluke 792A
300 k	0.012	0.012	0.012	Fluke 792A
500 k	0.043	0.043	0.043	Fluke 792A
1 M	0.06	0.045	0.045	Fluke 792A

7 V Range

	2 V	6 V	
10	0.02	0.02	Fluke 792A
20	0.007	0.006	Fluke 792A
40	0.003	0.003	Fluke 792A
(0.01, 1, 10, 20) k	0.003	0.0011	Fluke 792A
50 k	0.005	0.004	Fluke 792A
100 k	0.006	0.005	Fluke 792A
300 k	0.012	0.012	Fluke 792A
500 k	0.044	0.043	Fluke 792A
1 M	0.05	0.046	Fluke 792A

22 V Range

	6 V	10 V	20 V	
10	0.02	0.02	0.02	Fluke 792A
20	0.007	0.006	0.006	Fluke 792A
40	0.003	0.003	0.003	Fluke 792A

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(0.1, 1, 10, 20) k	0.003	0.002	0.002	Fluke 792A
50 k	0.005	0.004	0.004	Fluke 792A
100 k	0.006	0.005	0.005	Fluke 792A
300 k	0.012	0.012	0.012	Fluke 792A
500 k	0.044	0.043	0.043	Fluke 792A
1 M	0.05	0.05	0.05	Fluke 792A

70 V Range

	20 V	60 V	
10	0.02	0.02	Fluke 792A
20	0.007	0.006	Fluke 792A
40	0.003	0.003	Fluke 792A
(0.1, 1, 10, 20) k	0.003	0.002	Fluke 792A
50 k	0.006	0.005	Fluke 792A
100 k	0.007	0.007	Fluke 792A
300 k	0.013	0.013	Fluke 792A

220 V Range

	60 V	100 V	200 V	
10	0.02	0.02	0.02	Fluke 792A
20	0.007	0.007	0.006	Fluke 792A
(0.04, 0.1, 1, 10, 20) k	0.004	0.003	0.003	Fluke 792A
50 k	0.007	0.007	0.006	Fluke 792A
100 k	0.007	0.007	0.007	Fluke 792A

1000 V Range

	200 V	1000 V	
10	0.02		Fluke 792A
20	0.009		Fluke 792A
(0.04, 0.1, 1, 10, 20) k	0.004	0.003	Fluke 792A
50 k	0.007	0.006	Fluke 792A
100 k	0.007	0.007	Fluke 792A

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AC Voltage – Measure ^{note 2}

Range	Frequency in Hz	Best Uncertainty (\pm) ^{note 1}	Remarks
(0 to 10) mV	1 to 40	0.06 % + 3 μ V	3458A
	40 to 1 k	0.05 % + 1 μ V	3458A
	1 k to 20 k	0.05 % + 1 μ V	3458A
	20 k to 50 k	0.12 % + 1 μ V	3458A
	50 k to 100 k	0.6 % + 1 μ V	3458A
	100 k to 300 k	4.6 % + 2 μ V	3458A
(10 to 100) mV	1 to 40	0.01 % + 4 μ V	3458A
	40 to 1 k	0.01 % + 2 μ V	3458A
	1 k to 20 k	0.018 % + 2 μ V	3458A
	20 k to 50 k	0.036 % + 2 μ V	3458A
	50 k to 100 k	0.1 % + 2 μ V	3458A
	100 k to 300 k	0.35 % + 10 μ V	3458A
(100 m to 1) V	1 to 40	0.009 % + 40 μ V	3458A
	40 to 1 k	0.009 % + 20 μ V	3458A
	1 k to 20 k	0.017 % + 20 μ V	3458A
	20 k to 50 k	0.035 % + 20 μ V	3458A
	50 k to 100 k	0.09 % + 20 μ V	3458A
	100 k to 300 k	0.35 % + 100 μ V	3458A
(1 to 10) V	300 k to 1 M	1.2 % + 100 μ V	3458A
	1 to 40	0.009 % + 0.4 mV	3458A
	40 to 1 k	0.009 % + 0.2 mV	3458A
	1 k to 20 k	0.017 % + 0.2 mV	3458A
	20 k to 50 k	0.035 % + 0.2 mV	3458A
	50 k to 100 k	0.09 % + 0.2 mV	3458A
(10 to 100) V	100 k to 300 k	0.35 % + 1 mV	3458A
	300 k to 1 M	1.2 % + 1 mV	3458A
	1 to 40	0.025 % + 4 mV	3458A
	40 to 1 k	0.025 % + 2 mV	3458A
	1 k to 20 k	0.025 % + 2 mV	3458A
	20 k to 50 k	0.04 % + 2 mV	3458A

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50 k to 100 k	0.14 % + 2 mV	3458A
100 k to 300 k	0.5 % + 10 mV	3458A
300 k to 1 M	1.8 % + 10 mV	3458A
(100 to 700) V		
1 to 40	0.05 % + 40 mV	3458A
40 to 1 k	0.05 % + 20 mV	3458A
1 k to 20 k	0.07 % + 20 mV	3458A
20 k to 50 k	0.14 % + 20 mV	3458A
50 k to 100 k	0.35 % + 20 mV	3458A

AC Voltage ^{note 2}
Measuring Equipment

Range (0 to 2.2) mV	Frequency in Hz	Best Uncertainty (\pm) ^{note 1}	Remarks
	10 to 40	0.4 % + 5 μ V	5700A / 5725A
	40 to 50 k	0.16 % + 5 μ V	5700A / 5725A
	50 k to 100 k	0.2 % + 7 μ V	5700A / 5725A
	100 k to 300 k	0.2 % + 13 μ V	5700A / 5725A
	300 k to 500 k	0.25 % + 30 μ V	5700A / 5725A
	500 k to 1 M	0.4 % + 30 μ V	5700A / 5725A
(2.2 to 22) mV			
	10 to 20	0.08 % + 5 μ V	5700A / 5725A
	20 to 20 k	0.05 % + 5 μ V	5700A / 5725A
	20 k to 50 k	0.07 % + 5 μ V	5700A / 5725A
	50 k to 100 k	0.13 % + 7 μ V	5700A / 5725A
	100 k to 300 k	0.16 % + 12 μ V	5700A / 5725A
	300 k to 500 k	0.2 % + 25 μ V	5700A / 5725A
	500 k to 1 M	0.45 % + 25 μ V	5700A / 5725A
(22 to 220) mV			
	10 to 20	0.07 % + 13 μ V	5700A / 5725A
	20 to 40	0.03 % + 10 μ V	5700A / 5725A
	40 to 20 k	0.015 % + 10 μ V	5700A / 5725A
	20 k to 50 k	0.04 % + 8 μ V	5700A / 5725A
	50 k to 100 k	0.1 % + 25 μ V	5700A / 5725A
	100 k to 300 k	0.14 % + 25 μ V	5700A / 5725A
	300 k to 500 k	0.2 % + 35 μ V	5700A / 5725A
	500 k to 1 M	0.4 % + 80 μ V	5700A / 5725A

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(220 m to 2.2) V	10 to 20	0.07 % + 100 μ V	5700A / 5725A
	20 to 40	0.02 % + 25 μ V	5700A / 5725A
	40 to 20 k	0.009 % + 6 μ V	5700A / 5725A
	20 k to 50 k	0.014 % + 16 μ V	5700A / 5725A
	50 k to 100 k	0.03 % + 70 μ V	5700A / 5725A
	100 k to 300 k	0.06 % + 130 μ V	5700A / 5725A
	300 k to 500 k	0.13 % + 350 μ V	5700A / 5725A
	500 k to 1 M	0.26 % + 85 μ V	5700A / 5725A
(2.2 to 22) V	10 to 20	0.06 % + 0.8 mV	5700A / 5725A
	20 to 40	0.02 % + 0.3 mV	5700A / 5725A
	40 to 20 k	0.009 % + 60 μ V	5700A / 5725A
	20 k to 50 k	0.014 % + 0.2 mV	5700A / 5725A
	50 k to 100 k	0.03 % + 0.4 mV	5700A / 5725A
	100 k to 300 k	0.06 % + 1.5 mV	5700A / 5725A
	300 k to 500 k	0.15 % + 5 mV	5700A / 5725A
	500 k to 1 M	0.32 % + 9 mV	5700A / 5725A
(22 to 220) V	10 to 20	0.06 % + 8 mV	5700A / 5725A
	20 to 40	0.02 % + 3 mV	5700A / 5725A
	40 to 20 k	0.01 % + 1 mV	5700A / 5725A
	20 k to 50 k	0.03 % + 4 mV	5700A / 5725A
	50 k to 100 k	0.06 % + 8 mV	5700A / 5725A
	100 k to 300 k	0.18 % + 8 mV	5700A / 5725A
(220 to 1100) mV	40 to 1 k	0.01 % + 4 mV	5700A / 5725A
	1 k to 20 k	0.02 % + 6 mV	5700A / 5725A
	20 k to 30 k	0.07 % + 11 mV	5700A / 5725A
(220 to 750) V	30 k to 50 k	0.07 % + 11 mV	5700A / 5725A
	50 k to 100 k	0.3 % + 45 mV	5700A / 5725A

AC Voltage – Measure Only ^{note 2}

Best Uncertainty (\pm) ^{note 1}
Frequency in Hz

Range (1 to 80) kV	60 1.2 %	Remarks VD120-3.1-B-K-BC
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CALIBRATION LABORATORIES

NVLAP LAB CODE 200730-0

NVLAP Code: 20/E10

Capacitance – Source: (100 to 10 k) Hz

Range	Best Uncertainty (\pm) ^{note 1}	Remarks
0.01 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
0.1 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
1 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
10 pf	0.02 %	Fixed Capacitors w/GR1615-A Bridge
100 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
500 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
1 nF	0.002%	Fixed Capacitors w/GR1615-A Bridge
10 nF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
200 nF	0.02 %	Fixed Capacitors w/GR1615-A Bridge

Capacitance – Measure: (50 to 1M) Hz

(1 a to 1.1 μ F	0.012 % + 30 aF	GR1615-A Bridge
(1.1 μ to 10 m) F	0.06 % + 30 aF	Quadtech 7600LCR Bridge

Capacitance – Measure Equipment ^{note 2}

Range	Frequency in Hz	Best Uncertainty (\pm) ^{note 1}	Remarks
(0.19 to 1.0999) nF	10 to 10 k	0.60 % + 0.01 nF	5520A
(1.1 to 3.2999) nF	10 to 3 k	0.60 % + 0.01 nF	5520A
(3.3 to 10.9999) nF	10 to 1 k	0.30 % + 0.01 nF	5520A
(11 to 109.999) nF	10 to 1 k	0.30 % + 0.01 nF	5520A
(110 to 329.999) nF	10 to 1 k	0.30 % + 0.3 nF	5520A
(0.33 to 1.09999) μ F	10 to 600	0.30 % + 1 nF	5520A
(1.1 to 3.2999) μ F	10 to 300	0.30 % + 3 nF	5520A
(3.3 to 10.9999) μ F	10 to 150	0.30 % + 10 nF	5520A
(11 to 32.9999) μ F	10 to 120	0.48 % + 30 nF	5520A
(33 to 109.9999) μ F	10 to 80	0.54 % + 100 nF	5520A
(110 to 329.999) μ F	DC to 50	0.54 % + 300 nF	5520A
(0.33 to 1.09999) mF	DC to 20	0.54 % + 1 μ F	5520A
(1.1 to 3.29999) mF	DC to 6	0.54 % + 3 μ F	5520A
(3.3 to 10.9999) mF	DC to 2	0.54 % + 10 μ F	5520A
(11 to 32.9999) mF	DC to 0.6	0.90 % + 30 μ F	5520A
(33 to 110) mF	DC to 0.2	1.31 % + 100 μ F	5520A

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NVLAP LAB CODE 200730-0

NVLAP Code: 20/E11
LF Inductance ^{note 2}

Source Only

Range	Best Uncertainty (\pm) in % ^{note 1}	Remarks
1 mH	0.07	Fixed Inductors w/Quadtech 7600
10 mH	0.07	Fixed Inductors w/Quadtech 7600
100 mH	0.07	Fixed Inductors w/Quadtech 7600
1 H	0.07	Fixed Inductors w/Quadtech 7600

Measure @ 1 kHz
(10 μ to 100) H

Quadtech 7600

NVLAP Code: 20/E15
AC Phase ^{note 2}

Measure

Range	Frequency in Hz	Best Uncertainty (\pm) ^{note 1}	Remarks
0° to 360°	1 to 50 k 50 k to 200 k	3 m° 11 m°	Clark-Hess 5002 Bridge Set Clark-Hess 5002 Bridge Set

AC Phase – Generate ^{note 2}
50mV to 100V

Range	Frequency in Hz	Best Uncertainty (\pm) ^{note 1}	Remarks
0° to 360°	1 to 1 k	13 m°	Clark-Hess 5500-2 Phase Standard
	1 k to 6.25 k	17 m°	Clark-Hess 5500-2 Phase Standard
	6.25 k to 50 k	21 m°	Clark-Hess 5500-2 Phase Standard
	50 k to 200 k	50 m°	Clark-Hess 5500-2 Phase Standard

100V to 120V

Range	Frequency in Hz	Best Uncertainty (\pm) ^{note 1}	Remarks
0° to 360°	1 to 1 k	1.7 m°	Clark-Hess 5500-2 Phase Standard
	1 k to 6.25 k	26 m°	Clark-Hess 5500-2 Phase Standard

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6.25 k to 50 k	37 m°	Clark-Hess 5500-2 Phase Standard
50 k to 200 k	95 m°	Clark-Hess 5500-2 Phase Standard

TIME AND FREQUENCY

NVLAP Code: 20/F01

Frequency – Source and Measure

<i>Range in Hz</i>	<i>Best Uncertainty</i> (\pm) ^{note 1}	<i>Remarks</i>
1 to 10	1×10^{-7}	WWVB with OCXO and Frequency Counters
10 to 26.5 G	7×10^{-9}	WWVB with OCXO and Frequency Counters

MECHANICAL

NVLAP Code: 20/M06

Torque ^{note 2}

Measure

<i>Range</i>	<i>Best Uncertainty</i> (\pm) ^{note 1}	<i>Remarks</i>
10 lbf-in to 600 lbf-ft	2.0 %	CDI

NVLAP Code: 20/M08

Mass ^{note 2}

<i>Range</i>	<i>Best Uncertainty</i> (\pm) ^{note 1}	<i>Remarks</i>
8 kg	12 mg	Echelon III
7 kg	12 mg	Echelon III
6 kg	12 mg	Echelon III
5 kg	9.3 mg	Echelon III
4 kg	8.8 mg	Echelon III
2 kg	6.9 mg	Echelon III
1 kg	3.6 mg	Echelon III
500 g	2 mg	Echelon III
200 g	0.68 mg	Echelon III
100 g	0.34 mg	Echelon III
50 g	0.17 mg	Echelon III

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20 g	0.10 mg	Echelon III
10 g	68 µg	Echelon III
5 g	54 µg	Echelon III
2 g	54 µg	Echelon III
1 g	54 µg	Echelon III
500 mg	43 µg	Echelon III
200 mg	43 µg	Echelon III
100 mg	43 µg	Echelon III
50 mg	43 µg	Echelon III
20 mg	43 µg	Echelon III
10 mg	43 µg	Echelon III
5 mg	43 µg	Echelon III
2 mg	43 µg	Echelon III
1 mg	43 µg	Echelon III

ELECTROMAGNETICS – RF/MICROWAVE

NVLAP Code: 20/R11

RF-DC Voltage/Current Converters ^{note 2}

Sinewave Flatness

Range in Hz	Best Uncertainty (\pm) in % ^{note 1}	Remarks
30 k to 1 M	0.014	Thermal Converters
1 M to 10 M	0.08	Thermal Converters
10 M to 30 M	0.17	Thermal Converters
30 M to 80 M	0.71	Thermal Converters
80 M to 100 M	0.84	Thermal Converters

NVLAP Code: 20/R17

RF Power ^{note 2}

Absolute

Range	Frequency in Hz	Best Uncertainty (\pm) ^{note 1}	Remarks
(+30 to -20) dBm	0.1 M to 1.3 G	0.10 dBm + M	8902A

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Harmonic Distortion (50 and 600 Ω)

Range	Best Uncertainty (\pm)^{note 1}	Remarks
0 dB @ (10 to 26 G) Hz	0.3 dB	8903B
		71209A

THERMODYNAMIC

NVLAP Code: 20/T05

Pressure

Absolute Pressure Source – Pneumatic

Range	Best Uncertainty (\pm)^{note 1}	Remarks
(0.2 to 100) psia	11 ppm + 0.07 m psia	Ruska 2465
(100 to 1000) psia	12 ppm	Ruska 2465

Gage Pressure Source – Gage

Range	Best Uncertainty (\pm)^{note 1}	Remarks
(0 to 1.2) psi	0.013 m psi	Ruska 2465
(1.2 to 100) psi	11 ppm	Ruska 2465
(100 to 1000) psi	12 ppm	Ruska 2465
(-20 to 20) in H ₂ O	11 ppm + 240 μ in H ₂ O	Differential

Gage Pressure Source – Hydraulic

Range	Best Uncertainty (\pm)^{note 1}	Remarks
(73 to 3000) psi	16 ppm	DHI PG7000
(725 to 30 000) psi	36 ppm	DHI PG7000

Determination of Piston Area

Range	Best Uncertainty (\pm)^{note 1}	Remarks
(2 to 100) psi	16 ppm	Ruska 2465
(100 to 1000) psi	17 ppm	Ruska 2465
(40 to 10 000) psi	35 ppm	DHI 5300

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Gage Pressure Source

Range	Best Uncertainty (\pm) ^{note 1}	Remarks
(0.5 to 300) psi	65 ppm	Measurements T3400
(-0.5 to -15) psi	200 ppm	Measurements T3400

Gage Pressure Source ^{note 2}

Range	Best Uncertainty (\pm) ^{note 1}	Remarks
(0.5 to 500) psi	73 ppm	Measurements T3500
(-0.5 to -15) psi	200 ppm	Measurements T3400

Hydraulic ^{note 2}

Range	Best Uncertainty (\pm) ^{note 1}	Remarks
(500 to 15 000) psi	0.03 %	Ametek T-150

NVLAP Code: 20/T07

Thermodynamic

Range in °C	Best Uncertainty (\pm) in °C ^{note 1}	Remarks
-10 to 110	0.011	Liquid Bath w/PRT
100 to 300	0.12	Dry Block Calibrator
300 to 600	0.23	Dry Block Calibrator

Measure only ^{note 2}

-195 to 660	0.011	PRT & Super Thermometer
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NVLAP Code: 20/T08

Thermocouple

Isothermal Block Verification ^{note 2}

Range	Best Uncertainty (\pm) ^{note 1}	Remarks
Ambient (~23 °C)	0.04 °C	Thermocouple Half Junction

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1. Represents an expanded uncertainty using a coverage factor, $k = 2$, at an approximate level of confidence of 95%.
2. Onsite calibrations available.

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A handwritten signature in black ink that reads "Sally S. Bruce".

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